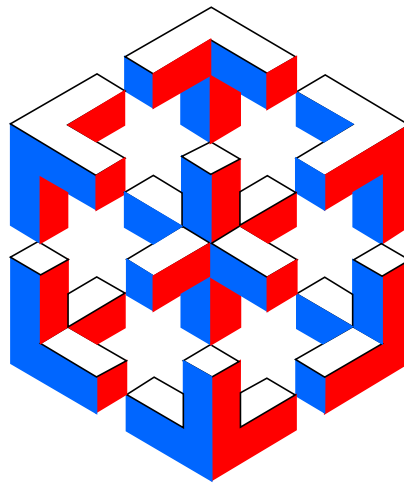


THE CENTER FOR MATHEMATICS, SCIENCE, AND TECHNOLOGY

CMST SUMMER OF 1999

- Two weeks of math & science excitement
- The challenge of technology
- Association with math & science professionals



- High school and middle school students
- Innovative problem solving
- Recreational activities
- Energetic atmosphere

An Educational Partnership of

THE NATIONAL SECURITY AGENCY
THE NASA GODDARD SPACE FLIGHT CENTER
THE UNIVERSITY OF MARYLAND EASTERN SHORE

Application Instructions

How do you use this brochure?

- ___ Step 1. Read the course descriptions in the brochure that are of interest to you.
- ___ Step 2. Using the instructions below, complete the application.

What steps should you follow to apply?

- ___ Step 1. Complete the *Student Application Form* and have your parent/guardian sign the permission statement. You may include standardized test scores if available. (We understand that these vary from school to school. They are optional.)
- ___ Step 2. Follow the *Student Essay instructions*.
- ___ Step 3. Have your parent/guardian complete the *Financial Assistance/Scholarship Application* if desired.
- ___ Step 4. Submit your *Student Application Form* to two teachers to complete the *Teacher Recommendation Form*. These teachers should be able to rate you in mathematics or science. The teachers may be school teachers or private instructors.

What do your teachers need to do?

- ___ Your teachers must complete the *Teacher Recommendation Form* and your guidance counselor must complete the *Test Data Form*. Applications must be postmarked by **April 3, 1999** and forwarded to:

Dr. Eddie Boyd, Jr.
Dean, School of Business and Technology
University of Maryland Eastern Shore
Research and Grants Building
Princess Anne, Maryland 21853

Student Essay Instructions

Limit your essay to the front side of an 8 1/2" x 11" sheet of paper.

- ___ Step 1. On the top of your paper, write your name.
- ___ Step 2. Choose your words carefully. Use these questions to help you think about the content of your essay: What do you hope to gain by participating in this program? What experiences have you had that are related to the course for which you are applying? In what extracurricular activities have you participated? What training and/or special honors have you received?
- ___ Step 3. Staple your essay and a photocopy of any test scores you wish to include (test scores are optional) to the top center of your essay page.

CMST - Summer of 1999

The Center for Mathematics, Science, and Technology is a two-week summer enrichment program for high school and middle school students. CMST provides an array of courses aimed at engaging students in mathematical and scientific problem solving using various innovative techniques. Through participation in any one of the courses, students will better understand the role of mathematics and science in a society increasingly dependent on technology. Students will emerge from the Center with increased confidence in themselves as problem solvers. Experimentation and in-depth exploration of mathematics and science are the hallmarks of the academic programs at the CMST. A philosophy focused on cooperative learning, affective education, and intense personal involvement finds expression not only in the academic program but also in a broad selection of recreational and evening activities.

LOCATION: University of Maryland Eastern Shore (UMES), Princess Anne, Maryland

QUALIFICATIONS: Students entering grades 6-12 with enthusiasm for mathematics and science and strong mathematical ability are encouraged to apply. For additional application forms call Dr. Boyd, UMES, on (410) 651-6430.

2-WEEK RESIDENTIAL CENTER FEE: \$525. Financial assistance is available. Students who receive financial assistance will be required to pay a non-refundable \$50.00 acceptance fee.

DATES: High School Session (Entering grades 9, 10, 11, 12) June 27 - July 10, 1999
Middle School Session (Entering grades 6, 7, 8) July 18 - July 31, 1999

Applications with completed teacher recommendations must be mailed to UMES, postmarked by **April 3**.

THE SELECTION PROCESS: Selection of students will be based on a composite review of the student essay, teachers' recommendations, and test scores if available (test scores are not required). In cases of overwhelming response, a lottery system may be used. Applicants will receive a letter by **May 10** indicating whether they have been selected. Selectees will also receive more specific information about CMST. Please do not make inquiries before this date.

EQUAL OPPORTUNITY: Minority students and handicapped students are encouraged to apply.

High School Courses (entering grades 9, 10, 11, 12): June 27 - July 10, 1999

1. Fractal Geometry and Chaos.

What does the shape of a cloud have to do with mathematics? What do dripping faucets, changes in the weather, and stock market trends have in common? All of these phenomena can be explained by the mathematics of *Chaos and Fractals*. In this course, you will use calculators and computers to explore the recently discovered world of chaotic dynamic systems - a world whose implications in meteorology, economics, computer graphics, and data compression, are not yet completely understood.

2. Advanced Problem Solving

Do you enjoy the challenge of perplexing questions? In this course, you will experience a two-week mentor relationship with a professional mathematician. Real-life problems requiring extensive study will be presented to your class. Students working alone or in small groups will each select a problem. They will identify the problem, examine the possible methods of solution, and conduct research and experiments. Computers will be a basic tool used to complete the study and students with previous programming experience are strongly encouraged to apply. Finally, using these research methods, students will draw conclusions and present their findings as part of a manuscript that will be submitted for publication.

3. Mission to Planet Earth

Exploring the Earth From Space: You've seen the headlines: "CO2 emissions linked to global warming," "Ozone hole detected over Antarctica," "Severe storms increasing," "Flooding in the northwest triggers landslides." Is the earth's environment changing, and are we driving the changes or simply going along for the ride? In this course, you will investigate global change issues with satellite data. You will see how scientists use observations of air, land, water, and life to develop a global understanding of our planet. Join us...and see what's really happening to your world.

4. Techmatics: Linking Programmable Technology and Mathematics

How can concepts of Programmable Technology and Computer Science be linked to such Discrete Mathematics Topics as probability, communication networks and pi? In this course you will develop programming techniques to write your own computer programs for selected mathematical investigations. You will use programmable technology to apply concepts of Discrete Mathematics used in engineering, computer science, physical science, and the life sciences.

5. Life on the Bay

Can we really save the Bay? What happens to watermen when we reduce fishing and crabbing limits, and what has happened to the oysters in the Bay? Does reducing acid rain also reduce jobs? You will be a part of a research team that will explore populations of ecosystems and see how pollution/environmental toxins affect the future of the watermen. You will explore many sites in the estuaries and islands of the lower Eastern Shore to collect information. You will then use your data to make recommendations and write a letter to the governor.

6. All the World's a Physics Toy: Flights of Fancy with Physics

What's new in the world of physics? Explore the physics of rockets and roller coasters. Discover the toys of physics. You will design your own roller coaster on a computer and launch your own rocket, then collect data from the real thing. Get a charge out of superconductivity and other flights of fancy. No previous physics course is required. We are looking for a few good minds!

7. Airways Science: Air Traffic Control, Flight Simulation, and Navigation

Learn to land a Lear Jet on an aircraft carrier and control air traffic at a busy airport without leaving your chair. The art of computer simulation has come to the world of aviation. Using computer networks, you will collect current weather conditions and flight data as you make a flight plan for cross country flight.

8. Mathematics and Chemistry/ Chemistry and Mathematics

How do scientists, mathematicians and engineers work together to design new molecules? How are mathematics and computer simulations used to analyze the structure and properties of crystals? The Greek mathematicians understood the properties of the Platonic Solids but never dreamed that their work would someday be used to design polymers. The work of chemical engineers and scientists is important to our future. You could be one of these engineers or scientists! Begin at CMST!

9. Space Medicine Research and Technology

How have the benefits of the space program affected the world of medical research and bio-technology? Are you interested in becoming a doctor, doing future medical research, or becoming a health care professional? Learn about the world of medicine and the rapid changes brought by new technologies. Learn how outer space has allowed us to explore the inner space inside the human body. Do you have the "right stuff" to be a part of the world of medicine?

10. Classical Cryptanalysis: The Science of Codebreaking

The ability to communicate information securely has become increasingly important in today's technology-driven society. Join us in this course and you will learn some of the mathematics used to analyze a variety of different classical encryption systems. You will also get the chance to apply these ideas and develop your problem-solving skills as you try to make sense out of a collection of challengingly encrypted information!

High School Field Trips *(from prior year's camps)*

Goddard Space Flight Center --to investigate space medicine

Wallops Island-- to gain a new perspective on planet earth

Raccoon Point, Chance, Smith Island--to learn about life on the Chesapeake Bay

Norfolk Airport and Dover AFB--to study air science and to fly

Quotes from past participants

I had so much fun! In my class we flew kites at Assateague, went to Wallops Island and saw the sounding rockets, and built wood gliders and hot air balloons. We launched model rockets and charted the flight time and analyzed it. I had really cool teachers...

CMST Camper

My two CMST campers returned home knowing they were loved for themselves. They found a common ground with others who became their lifelong friends. The Technological and Mathematical training they received at CMST filled a hunger not addressed anywhere else...

CMST Parent

I would like to thank you for giving me the opportunity to attend the High School Session of CMST... I had a glorious time this session and hope to have the same type of adventure next year with another challenging course. Most important I had fun, made friends and learned a lot. I had the opportunity to fly a Cessna 152...a million dollar simulator for an E2-C...and got to talk to the Navy's top test pilots.

CMST Camper

**FINAL COURSE OFFERINGS ARE CONTINGENT UPON FUNDING AND ENROLLMENT
FIELD TRIPS ARE SUBJECT TO SITE AVAILABILITY**

Middle School Courses (entering grades 6, 7, 8, 9): July 18 - July 31, 1999

11. The Mathematical Mind

Are you intrigued by the concept of infinity? Are you curious about strange kinds of numbers and operations where $3 + 6 = 2$ and $3i * 2i = -6$? Do you love the challenge of solving problems that require deep insight and persistent thought? In this course you will learn to think like a mathematician. Find out how telling time is like snapping rubber bands and how relatives are like musical pitches. You will encounter problems that seem deceptively simple, some of which have never been solved. You will even have the opportunity to make up your own unusual number systems and problems.

12. Energy 2000

The automobile is a symbol of our current dependence on fossil fuels for energy. What will the citizens of the 21st Century use for energy sources? Scientists today are exploring with atomic fusion and solar energy as electrical power sources. You will work as part of a production team to study alternative energy sources and design and build an electric car prototype. You will analyze the efficiency of your car and make a presentation to justify its production by *CMST Motors*.

13. Aeronautics and Rocketry

Have you ever wondered if you could design a flight vehicle better than Leonardo da Vinci or the Wright brothers? In this class you will investigate the principles of lift, thrust and drag as you launch an aerodynamic vehicle of your own design. Learn to fly your computer. As your rocket soars in the air you will test the forces of gravity and wind. Join this class and have a blast!

14. Codes, Games, and Chance

Siht dear uoy nac? If you can, then you may be ready for the world of computer codes, the mathematics of games, and the secrets of probability. You will learn how probability and statistics aid in the solving of codes and ciphers. You will design games of chance and play those designed by the class. You will be able to tell if a game is truly fair. What does sending messages in code have to do with your CD player? Sign up for this class and trap an error!

15. Astronomy Village: Investigating the Universe

Explore the universe in a virtual telescope. You will investigate super nova, black holes and planets as part of a discovery team's research project. Each investigation team is guided by an astronomer mentor and can receive e-mail, use star-simulation programs and search digitized Hubble Telescope images. It is possible for you to make a new discovery while you explore the same images used by astronomers. The course was developed by NASA's Classroom of the Future Project.

16. The Digital World of Robotics

Would you like to teach a robot to think? What are digital circuits and digital logic? How do you tell a robot what to do? What can robots do? What can't they do? Industrial robots today perform many dangerous and repetitive tasks in manufacturing. They are able to function in areas of extreme temperature and radioactivity without oxygen. You will explore the digital language of robots and produce a programmable robot. Your robot will be able to complete a variety of assigned tasks, but will it be able to think without you?

17. Bay Rangers: Environmental Studies

Have you ever wondered if fish or oysters or clams get sick and suffer the same symptoms of disease as we do? How do we keep our water systems safe? The implications of our behavior today on the lives of others will be analyzed. You will visit many sites on the Lower Eastern Shore to learn about our Chesapeake Bay. This course will meet many of the requirements for the Environmental Science Merit Badge for the Boy Scouts of America and also allow you to earn Service Learning Hours.

18. Problem solving with Programmable Technology

How can mathematics, computer programming, and technology merge to empower and entertain? In this course you will design, write, enter, and "debug" your own computer programs. You will use computer programming techniques to create your own computer game. You will apply concepts of mathematics and techniques of computer science to problem solving. You will program graphing calculators and computers to visualize mathematics.

19. Blue Ice

The only two colors found in nature in Antarctica are white and blue...the colors of the ice. This strange land is the last frontier on earth. You will study and experiment, along with a NASA Antarctica explorer, about drifting continents, frozen meteorites and the upper atmosphere. This land (without cities, forests, tillable land or any type of culture to call its own) is the site of some of the most vital research about our planet's future. You and your research team will have an Antarctic Adventure and visit the South Pole with your CMST computer.

20. Art in Mathematics

How does a mathematician look at patterns? Geometric patterns and designs are beautiful. Artists have used the ideas of infinity, number theory, knot theory, and transformations to create great masterpieces. Explore projective geometry and its applications in perspective. The beauty of self-similar fractals will be explored. You will use your hands as well as computers in this course. Discover the world of M.C. Escher and create your own mathematical art.

Middle School Field Trips *(from prior year's camps)*

Wallops Island-- to study rocketry, astronomy, and problem solving

Raccoon Point, Horn Point Environmental Lab, Vienna Power Plant--to learn about life on the Chesapeake Bay

Matech-- to find out about robotics

Cryptologic Museum--to discover codes and ciphers

Ocean City/Salisbury--to experience art in mathematics

--to measure acceleration on roller coasters

Quotes from past participants

After attending CMST, my grades improved dramatically...I graduated third in my class...I am currently a Dean's List student at Rensselaer Polytechnic Institute...I want to be a CMST counselor because I want to have a similar effect on the current crop of CMST campers...
CMST Alumnus

After being a camper for six years and a counselor...I can honestly say that my fondest memories of my teenage years were at CMST. ...I now have my mathematics education degree and will end my experience with CMST as a highly motivated mathematics teacher...
CMST Alumna and Counselor

Thank you for the scholarship. Without it I wouldn't have been able to have the great time that I had here. ...I will spread the word about CMST. Let this program never die!
CMST Camper

**FINAL COURSE OFFERINGS ARE CONTINGENT UPON FUNDING AND ENROLLMENT
FIELD TRIPS ARE SUBJECT TO SITE AVAILABILITY**

1999 CMST APPLICATION FORM

(PLEASE PRINT IN INK OR TYPE)

(NOTE: This form must be completed and postmarked by **April 3, 1999**)

1. _____
LAST NAME FIRST NAME INITIAL

2. I am applying to (check one):

_____ High School Session (Entering Grades 9, 10, 11, 12)

_____ Middle School Session (Entering Grades 6, 7, 8, 9)

3. My course choices are

First choice # _____ Title: _____

Second choice # _____ Title: _____

Third choice # _____ Title: _____

4. _____
STREET ADDRESS OR BOX NUMBER

_____ TOWN / CITY STATE ZIP CODE COUNTY OR BALTIMORE CITY

HOME PHONE NUMBER WITH AREA CODE

5. My age is _____ 6. Date of birth _____ 7. M / F 8. Entering grade _____
MONTH DAY YR SEX

9. Ethnic Origin (Check only one): Minority and handicapped students are encouraged to apply.

a. ___Caucasian

b. ___African American

c. ___Asian American

d. ___Native American Indian

e. ___Hispanic

f. ___Other

10. U.S. Citizen Yes ___ No ___

11. Name of school I attend _____

12. My school is Public ___ Private ___

13. I (have ___ / have not ___) previously attended CMST. Year _____

PERMISSION STATEMENT:

I HEREBY GRANT PERMISSION FOR MY CHILD TO APPLY TO THIS PROGRAM AND FOR SCHOOL OFFICIALS TO PROVIDE THE TEACHER RECOMMENDATIONS. I UNDERSTAND THAT THE TEACHER RECOMMENDATIONS WILL BE MAINTAINED IN CONFIDENCE AND THAT APPLICATIONS WILL NOT BE RETURNED TO STUDENTS. ALSO, I WILL ALLOW MY CHILD TO COMPLETE QUESTIONNAIRES DESIGNED TO EVALUATE THE PROGRAM. I FURTHER PERMIT MY CHILD TO PARTICIPATE IN MEDIA EVENTS DESIGNED TO PROMOTE THE BENEFITS OF GIFTED EDUCATION.

NAME OF PARENT/GUARDIAN (PLEASE PRINT)

DAY TELEPHONE NUMBER EXT

NAME OF PARENT/GUARDIAN (PLEASE PRINT)

DAY TELEPHONE NUMBER EXT

SIGNATURE OF PARENT/GUARDIAN

DATE

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1999 CMST Teacher Recommendation Form

(NOTE: This form must be completed and postmarked by **April 3, 1999**)

Directions to Teachers (two teacher recommendations are needed):

This student has applied to the *Center for Mathematics, Science, and Technology*. All students entering grades 6-12 with enthusiasm for mathematics and science are encouraged to apply. Students need not be identified as gifted and talented. Please relate your responses specifically to the student's abilities and enthusiasm for mathematics and science. It may be helpful to have input from other teachers. Use the scale below to rate the student by comparing his/her abilities to those of other high ability students you have taught in the past few years.

1	2	3	4	5
TOP	TOP	TOP	TOP	TOP
15-20%	10-15%	6-10%	2-5%	1%

Mathematics Teacher: _____highest

- | | | | | | |
|---|---|---|---|---|---|
| 1. Demonstrates ability in mathematics and science | 1 | 2 | 3 | 4 | 5 |
| 2. Engages in academic risk-taking behaviors (experimenting, researching, challenging). | 1 | 2 | 3 | 4 | 5 |
| 3. Generates ideas or solutions to problems and questions. | 1 | 2 | 3 | 4 | 5 |
| 4. Demonstrates an ability to work with commitment, both independently and as part of a group. | 1 | 2 | 3 | 4 | 5 |
| 5. Demonstrates an ability to evaluate progress in accomplishing tasks. | 1 | 2 | 3 | 4 | 5 |
| 6. Is this student ___one of the best I have ever taught, ___among top 5%, ___above average, ___a good student? | | | | | |
| How would you characterize this student's potential for success in this course? | | | | | |
-
-
-
-

SIGNATURE OF TEACHER

NAME PRINTED

SUBJECT

GRADE RECEIVED

Science or Tech Ed Teacher: _____highest

- | | | | | | |
|---|---|---|---|---|---|
| 1. Demonstrates ability in mathematics and science | 1 | 2 | 3 | 4 | 5 |
| 2. Engages in academic risk-taking behaviors (experimenting, researching, challenging). | 1 | 2 | 3 | 4 | 5 |
| 3. Generates ideas or solutions to problems and questions. | 1 | 2 | 3 | 4 | 5 |
| 4. Demonstrates an ability to work with commitment, both independently and as part of a group. | 1 | 2 | 3 | 4 | 5 |
| 5. Demonstrates an ability to evaluate progress in accomplishing tasks. | 1 | 2 | 3 | 4 | 5 |
| 6. Is this student ___one of the best I have ever taught, ___among top 5%, ___above average, ___a good student? | | | | | |
| How would you characterize this student's potential for success in this course? | | | | | |
-
-
-
-

SIGNATURE OF TEACHER

NAME PRINTED

SUBJECT

GRADE RECEIVED

1999 CMST TEST DATA FORM

Student's Name: _____

(please print)

Test Data is being collected for research purposes. Complete for all applicants.

Directions to Guidance Counselor:

I. Report the most recent available scores for standardized norm-referenced ACHIEVEMENT TEST and APTITUDE TEST.

A. Achievement Test

Full Name of Test _____

Grade & Date of Test Administered: _____

Provide **Percentile Rank** for the following:

Reading Total

Language Total

Mathematics Total

Battery Total

B. Aptitude Test

Full Name of Test _____

Grade & Date of Test Administered: _____

Provide **Percentile Rank** for the following:

Verbal Score

Quantitative Score

Total Score

C. **Note:** Check here if no test data is available for this student. ☐

Note: Supplemental data, including psychological testing data documenting identified learning disabilities which may impact on student participation, may be submitted with application.

II. **Gifted and Talented Identification Status.** Check areas for which this student has been identified for gifted and talented services:

General Intellectual Abilities: ☐

Specific Intellectual Abilities:

Science ☐

Mathematics ☐

Social Studies ☐

Reading/English Language Arts ☐

Visual & Performing Arts ☐

Other (specify) _____

School System does not formally identify students as gifted and talented ☐

I certify that to the best of my knowledge, the above results are accurately reported.

Signature of Counselor

Position Title

Date

Mail to:

Dr. Eddie Boyd, Jr.
Dean, School of Business and Technology
University of Maryland Eastern Shore
Research and Grants Building
Princess Anne, Maryland 21853

MUST BE POSTMARKED BY APRIL 3, 1999

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Financial Assistance/ Scholarship Application

Complete this section only if you are applying for financial assistance. Decisions regarding student selection are independent of requests for financial assistance/scholarships. Consideration for **full scholarship/financial aid** will be given first to students from families who meet requirements for reduced school lunch as defined below. A **partial scholarship/financial assistance** may be considered for students with documented extenuating family circumstances/obligations.

Total Family Size	Income Before Deduction
2	\$19,629
3	24,661
4	29,693
5	34,725
6	39,757
7	44,789
8	49,821
For each additional family member add \$5,032.	

CMST OFFICE USE

1. Does student meet requirements for reduced school lunch? Yes___ No___
2. Family income before deductions: \$_____
3. Number of family members, including parents and children: _____
4. Complete only if your income was reduced in the past year: Present monthly income: \$_____
5. Provide below any other information that might be helpful in determining financial need or explaining extenuating circumstances.

I verify that the above information is reported accurately:

PARENT/GUARDIAN SIGNATURE

DATE

MUST BE POSTMARKED BY APRIL 3, 1999

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